

A Population-Based Study on Return to Work After Traumatic Injuries

Zahra Sehat¹, Esmail Fakharian^{1,2}, Mojtaba Sehat¹, Abdollah Omid^{1,3}

¹Trauma Research Center, Kashan University of Medical Sciences, ²Department of Neurosurgery, Trauma Research Center, Kashan University of Medical Sciences, ³Department of Clinical Psychology, Faculty of Medicine, Kashan University of Medical Sciences, Kashan, Iran

ORCID:

Zahra Sehat: 0000-0002-1712-7580

Abstract

Background: Trauma is one of the main causes of morbidity and mortality in developing countries. Most of the people who have trauma are young and in the activity period of living. Trauma is the main cause of disability in the young population. Trauma also affects return to work (RTW). RTW is a specific criterion for trauma evaluation. This study aims to investigate the RTW period after traumatic injuries. **Methods:** In this cross-sectional study used household survey data collected during a 2018–2019 study on over 15 years in Kashan. We conducted univariate and multivariate analyses to evaluate associations of RTW during 1 year after trauma. Relation between RTW and risk factors was investigated at three levels: preinjury (demographic) factors, injury-related factors, and postinjury factors. **Results:** In this study, the incidence of trauma in 1000 estimated 70.61 (62.60–78.70) in 1 year. Nearly 77.73% were male. The most mechanism of trauma (51%) was related to traffic accidents. Nearly 9.1% of people with trauma had returned to their daily activities 1–6 days and 7.3% RTW after 7–14 days and 11.2% RTW after 60 days. **Conclusion:** Findings of this study indicated that time of RTW was related to three levels of factor: preinjury factors, injury-related factors, and postinjury factors. These factors need to be evaluated in larger-scale, long-term studies with more homogeneous samples in terms of the type and the severity of traumas.

Keywords: Disability, mental health, posttrauma stress, quality of life, return to work, socioeconomic status, trauma

INTRODUCTION

Trauma is one of the main causes of morbidity and mortality in developing countries. Most of the people that have trauma are young people and activities of daily living. Nearly 12% of the global burden associated with trauma.^[1,2] In all over the world, sixth cause of death is unintentional injuries. In Iran, injuries are the second major cause of mortality and 28% of the total number of disability-adjusted life years due to all disease and injuries were related to traumas.^[3,4]

Recently, survivors of trauma have increased. Most of the people who have trauma are young and in activities of daily living.^[5] Trauma has socioeconomic burdens directly and indirectly and has a strong effect on return to work (RTW) time.^[6,7] One of the specific criteria for trauma evaluation is RTW, which can

be explained by several factors such as personal, occupational, and trauma-related factors.^[8,9] According to results of studies, the prevalence of RTW is 15–80%.^[10,11] Due to preinjury variables such as education, occupational factors and age, gender, educational status, and socioeconomic status (SES), injury-related factors for RTW include type of trauma, number of injured organs, which organs injured, injury severity score (ISS), and length of hospital stay.^[12,13] The previous study determined that intracranial abnormalities, where the associations between RTW and intracranial computed tomography abnormalities are inconsistent.^[14] To be unemployed affects several dimensions on life such: physical, psychological, and social health.^[15-17] RTW and vocational status were one of the best indicators

Address for correspondence: Dr. Zahra Sehat, Trauma Research Center, Kashan University of Medical Sciences, Ghotb-e-Ravandi Blvd., Kashan, Iran. E-mail: sehat.zahra426@gmail.com

Received: 25-Sep-2020

Revised: 04-Jan-2021

Accepted: 06-Jan-2021

Published: 31-Mar-2021

Access this article online

Quick Response Code:



Website:
<http://iahs.kaums.ac.ir>

DOI:
10.4103/iahs.iahs_97_20

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Sehat Z, Fakharian E, Sehat M, Omid A. A population-based study on return to work after traumatic injuries. *Int Arch Health Sci* 2021;8:24-30.

of real world functioning.^[18] Identifying predictors for RTW may help to identify those who may benefit from a follow-up rehabilitation program.^[15-17] Post-injury predictors for RTW can include nausea or vomiting, severe pain, headache, and widespread pain that are common complications, fatigue and depression and post-trauma stress and disability.^[15-17,19]

Factors influencing RTW after trauma show an inconsistent pattern.^[18,19] This could be explained by different study designs: differences in follow-up time, retrospective data-collection, high dropout rates, and inclusion of participants employed and not employed before burn. There is evidence that preinjury employment is one of the most influential factors regarding RTW after burn.^[5,11,14]

Considering that there is extensive research on posttraumatic complaints and RTW in the world. RTW has not been evaluated in Iran, also studies that have been done, focused on certain types of trauma such as head traumas or major traumas. There are limited data on the prevalence of RTW and determined the relationship of demographic and trauma and posttrauma factors to time of RTW. The aim of the study was to determine the annual incidence and related risk factors to RTW after trauma in adults older than 15 years old in Kashan.

METHODS

Study design and population

This was a cross-sectional study on individuals over 15 years that households residing in Kashan during 2018–2019. The two-stage cluster-stratified design method was used for sampling. The city of Kashan was divided into five areas according to the municipal divisions on the geographical map of Kashan city; clusters of each area were defined in the map. According to the population of each area, the sample size was determined in five areas. All clusters in each area were numbered, and the clusters were randomly selected. In each cluster, one house randomly selected, and systematically, the 25 houses were next, have been surveyed. From all clusters in each area, 25 households were studied. The interviewers referred to any households that were determined and designated on the map, in each house between all members that were over 15 years old, randomly selected one person for an interview at their homes.^[20-22] From all randomly selected individuals were asked demographic and trauma information and time between event trauma and RTW.

Sample size

According to the incidence in 1 year of all injuries (p) that was 25/1000 person-years in 2013^[2,23] and the following formula to estimate the minimum needed sample size was used. Considering $d = 1.5$.

$$n = \frac{Z_{1-\alpha/2}^2 \times p \times q}{d^2} \quad (1)$$

Due to the frequency of trauma that is 32.3%, the required sample size for the study was multiplied by 1.5 in the design effect, and a total of 3875 study samples were determined.^[4]

Ethical approval

This study was being approved by the ethical committee of Kashan Medical Science University, Kashan, Iran. Code of ethics was 1397,094.

Instruments

The information collected was categorized as preinjury factors, injury-related factors, and postinjury factors.

Preinjury factors

Age in years, sex, nationality, marriage, education, and job and employment status. SES, insurance, information about smoking habits, alcohol consumption, and diseases.

Socio economic status level

Asset method was used to measure SES status. To determine the economic status of individuals according to the method described by previous studies using principal components analysis, ten home items and two cases of social factors (job and education of the head of household) of the new variable. Asset index was calculated and divided into three groups with high, middle, and low SES status in three groups with high SES status.^[24,25]

Injury-related factors

Mechanism of trauma contained fall, work trauma, traffic accident injuries, burn, violence, and number of injuries: one or multiple injuries and surgical treatment.

Postinjury factors

Quality of life (QOL), mental health (MH), posttrauma stress, and disability.

In this study, in order to measure the level of QOL, MH, posttrauma stress, disability, the following tests were used, respectively; Short Form-12 QOL, 28-item General Health Questionnaire, posttraumatic stress disorder (PTSD) Checklist (PCL), and WHODAS II disability questionnaire.^[26,27]

Data analysis

In this study, data analysis with SPSS (IBM SPSS Statistics, Windows, Version 18.0, Chicago: SPSS Inc; 2009) was performed. Chi-square and t -tests were used to examine the differences between the two variables. Logistic regression analysis was used to examine the variables that were significantly associated with RTW after trauma. The significance level was considered <0.05 . Univariate analysis was used to investigate the relationship between variables and trauma outcomes.

In the phase step of the logistic regression model, have been estimated the unadjusted model for each of the pre-injury, injury-related, and post-injury factors to detect all predictors with an association with RTW. In the second step, have been estimated the fully adjusted model for all significant predictors from the first phase. In the third phase, we estimated the final model including only the significant predictors from the fully adjusted model. The final model was developed to avoid multicollinearity, increase the power, and improve the precision (standard error, confidence interval) of the estimated odds ratios (OR).

RESULTS

In this study, 3880 households were surveyed that between them 274 (7.061%) people have trauma during the last year, and 213 (77.73%) of them were male; also 137 (50%) of trauma occurred among people aged 20–39 years. One hundred and seventy-seven (64.5%) of people with trauma were married. Furthermore, 72 (26.2%) of with trauma have low SES status, 150 (54.7%) have middle SES status, and 52 (18.9%) have high SES status.

The most mechanism of trauma 140 (51%) was related to traffic accidents, and among the traffic accidents, the highest cause was motorcycles 99 (70.71%).

One hundred and eighty-four (67%) of people with trauma had more than 24 h hospitalization. Among hospitalized patients, 76 (41.40%) received surgical treatment, and 108 (58.6%) received nonsurgical treatment.

In this study, 47 (17.2%) of people with trauma have PTSD, and 244 (89.3%) have a mild disability, and 29 (10.7%) have a moderate disability and no case that reported a severe disability. Ninety-two (33.6%) were suspected of having mental disorder. One hundred and thirty-four (49%) had a moderate QOL and rate of poor QOL was 16.4% (45/274), and good QOL was 95 (34.7%). Rate of RTW after trauma in this study was 91.2%. Furthermore, 32 (12.80%) of people with trauma were RTW in 1–6 days after trauma and 20 (8.00%) of them were RTW in 7–14 days and 115 (46.00%) of them were RTW 15–30 days after trauma, 51 (20.40%) of them were RTW 31–60 days after trauma, and 32 (12.80%) of them were RTW ≥61 days.

Table 1 indicates that frequency of hospitalization and RTW in traffic accidents is higher than other mechanisms of trauma. Statistical tests showed a significant difference between the mechanism of trauma and hospitalization and RTW. The possibility of delay in RTW in traffic accidents is 1.3 and the risk of hospitalization is 1.7.

In this study, relation between RTW and risk factors was investigated at three levels: 1 – preinjury (demographic) factors, 2 – injury-related factors, and 3 – postinjury factors. Table 2 shows the RTW based on preinjury factors.

In this study, RTW among >30 years old people was significantly longer than the 15–30-year-old group, and there was not a statistically significant difference among the age groups ($P = 0.032$) and there was no significant difference between male and female participants in RTW ($P = 0.63$). Persian nationality peoples had more RTW compared with non-Iranian nationality peoples ($P = 0.05$). Moreover, the rate of RTW among peoples with special illness such as

diabetes and hypertension was significantly less ($P = 0.001$). Peoples with education were a significantly higher RTW rate ($P = 0.002$). Furthermore, people with insurance coverage had a significantly high rate of RTW ($P = 0.002$).

In this study, the relationship between the mechanism of trauma and the time of RTW [Figure 1] was significant ($P = 0.07$). Among the various mechanisms of trauma, traffic injuries have longer time to RTW after injury. Table 3 shows the relationship between time RTW and the injury factors.

In this study, most of people have time span, 15 and 30 days between trauma and RTW. People with multiple injury and surgery treatment have less RTW of other. Table 3 shows the RTW based on trauma factors.

Table 4 shows the relationship between RTW and postinjury factors that in this paper were included QOL, MH, posttrauma stress, and disability, according to data of this table, QOL, MH, and disability have significant relationship with time of RTW, but MH has not significant relationship with RTW ($P = 0.18$).

Table 5 shows the results of the logistic regression analysis. In this, we tried to present all of the predictors which were included in the fully adjusted model. As preinjury factors, injury-related factors, and postinjury factors. In the logistic regression model at 5% significance level, a significant association between RTW during 1 year after injuries and age 15–30 years, educated people, insurance, multi injuries, moderate disability, and PTSD. To have been mildly disability after injury had the largest OR 5.75 (3.3, 7.3) and being in middle SES had an OR of 2.54 (1.3, 2.7).

DISCUSSION

In this study, the incidence of trauma was estimated 70.61 in 1000 person in 1 year. Nearly 77.73% were male and aged

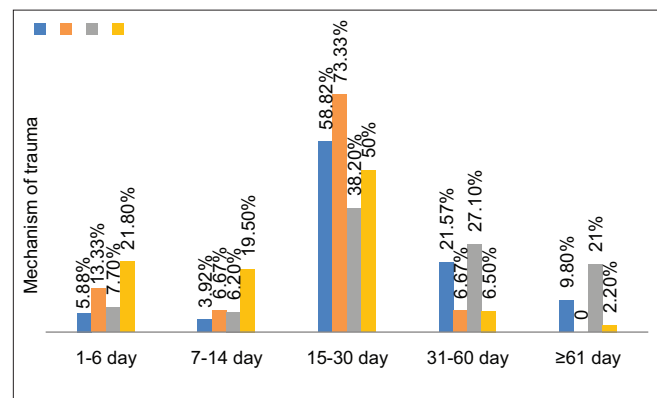


Figure 1: Return to work base on mechanism of trauma

Table 1: Distribution of absolute and relative frequency of return to work and hospitalization on trauma mechanism

Trauma mechanism	Traffic (%)	Nontraffic (%)	Total (%)	P	RR (95% CI)*
Hospitalization ≥1 days	133 (54.7)	110 (45.3)	243 (100)	0.001	1.71 (2.61-35.1)
Return to work	127 (50.8)	123 (49.2)	250 (100)	0.044	1.37 (1.81-1.03)

*Univariate regression. CI: Confidence interval, RR: Relative Risk

Table 2: Return to work based on preinjury factors

	Time returned to work ^a					Total (%)	P ^b
	1-6 days (%)	7-14 days (%)	15-30 days (%)	31-60 days (%)	≥61 days (%)		
Gender							
Male	23 (11.98)	18 (9.38)	90 (46.88)	34 (17.71)	27 (14.06)	192 (100)	0.0063
Female	9 (15.52)	2 (3.45)	25 (43.10)	17 (29.31)	5 (8.62)	58 (100)	
Age-group (years)							
15-30	14 (18.67)	5 (6.67)	35 (46.67)	17 (22.67)	4 (5.33)	75 (100)	0.032
>30	18 (10.29)	15 (8.57)	80 (45.71)	34 (19.43)	28 (16)	175 (100)	
Persian nationality	32 (13.22)	20 (8.26)	113 (46.69)	47 (19.42)	30 (12.40)	242 (100)	0.05
Marriage							
Single	7 (11.86)	3 (5.08)	45 (76.27)	13 (22.03)	5 (8.47)	73 (100)	0.07
Marriage	25 (14.12)	17 (9.60)	70 (39.55)	38 (21.47)	27 (15.25)	177 (100)	
Employment	24 (13.11)	14 (7.65)	84 (45.90)	36 (19.67)	25 (13.66)	183 (100)	0.043
Education							
Noneducated	3 (37.50)	1 (12.50)	0	3 (37.50)	1 (12.50)	8 (100)	0.002
Educated	29 (11.98)	19 (7.85)	115 (47.52)	48 (19.83)	32 (13.22)	242 (100)	
Socioeconomic status							
Low	9 (14.3)	5 (7.9)	27 (42.9)	11 (17.5)	11 (17.5)	63 (100)	0.03
Middle	15 (10.9)	8 (5.8)	66 (48.2)	29 (21.2)	19 (13.9)	137 (100)	
High	8 (16)	7 (14)	22 (44)	11 (22)	2 (4)	50 (100)	
Insurance	27 (15)	11 (6.11)	91 (50.56)	36 (20)	26 (14.44)	180 (100)	0.025
Illness	11 (16.42)	0	30 (44.78)	17 (25.37)	9 (13.43)	67 (100)	0.01
Smoking	5 (9)	6 (11.3)	23 (38.6)	11 (20.4)	11 (20.4)	56 (100)	0.00
Drugs/alcohol addiction	1 (7.6)	1 (7.6)	4 (23)	1 (7.6)	8 (53.8)	15 (100)	0.00

^aData present as, n (%), ^bFisher's test

Table 3: Return to work based on trauma factors

	Time returned to work					Total (%)	P ^a
	1-6 days (%)	7-14 days (%)	15-30 days (%)	31-60 days (%)	≥61 days (%)		
Mechanism of trauma							
Fall	3 (5.88)	2 (3.92)	31 (58.82)	12 (21.57)	6 (9.80)	54 (100)	0.00
Work trauma	2 (13.33)	1 (6.67)	12 (73.33)	1 (6.67)	0	16 (100)	
Traffic injury	10 (7.7)	9 (6.2)	52 (38.2)	37 (27.1)	28 (21)	136 (100)	
Other ^b	10 (21.8)	9 (19.5)	23 (50)	3 (6.5)	1 (2.2)	46 (100)	
Number of injury							
Single injury	13 (17.1)	8 (11.4)	38 (51.4)	14 (18.6)	1 (1.4)	74 (100)	0.00
Multiple	14 (7.7)	13 (7.1)	78 (44.6)	39 (22)	32 (18.4)	176 (100)	
Treatment							
Surgery	2 (1.9)	1 (0.9)	32 (43.4)	23 (30.2)	18 (23.6)	76 (100)	0.00
Other	30 (17.4)	25 (14.4)	86 (49.2)	24 (13.6)	9 (5.3)	174 (100)	

^aFisher's test, ^bIncluding: Bites or animal attack, drowning, suicide attempt, injury during exercise, sharp objects, violence, burn

20–40 years, also 75.7 were married. The most mechanism of trauma was related to traffic injuries. In this study, 67% of people with trauma had more than 24 h hospitalization due to trauma, and 41.40% received surgical treatment. That, this result was similar to other studies that done in this filed, such a study in Iran, and in other studies.^[28-30] In a study on patients emergency department as road traffic trauma in the northeast of Iran, in 2013. Of these patients, 84.4% were male, and the mean age was 28.89 ± 16.62 years. The highest frequency was related to motorcyclists. The head, face, and lower extremities were the most common traumatized area, and in the hospital, the mortality rate was 4.6%.^[31]

The findings revealed that rate of RTW after trauma in this study was 91.2%; also, 12.80% of them RTW 1–6 days after trauma and 8% of them RTW 7–14 day and 46% of them RTW 15–30 days after trauma, 20.4% of them RTW 31–60 days after trauma, and 32 (12.80%) of them RTW ≥61 day. This is almost congruent with the findings of the previous studies. For instance, findings from a study were conducted in 2015, between people with trauma and people with trauma complications, 99.2% had returned to their daily activities. The results of these studies show that the prevalence of RTW, RTA, and RTE is 15–80%.^[32]

Moreover, other study^[33] also found that 68% of their participants returned to work during the 6 months after trauma.

Table 4: Return to work based on postinjury factors

	Time returned to work					Total (%)	P*
	1-6 days (%)	7-14 days (%)	15-30 days (%)	31-60 days (%)	≥61 days (%)		
Quality of life							
Poor	0	0	20 (48.4)	13 (32.3)	8 (19.4)	41 (100)	0.02
Moderate	14 (11.5)	11 (9)	55 (45.1)	28 (23)	14 (11.5)	122 (100)	
Good	11 (12.9)	9 (10.6)	42 (48.2)	12 (14.1)	12 (14.1)	87 (100)	
Mental health							
Suspicious	12 (14)	9 (10.5)	37 (43)	21 (24.4)	7 (8.1)	86 (100)	0.18
Normal	13 (8.6)	11 (7.2)	74 (48.7)	29 (19.1)	25 (16.4)	164 (100)	
Posttrauma stress	1 (2.4)	1 (2.4)	22 (52.4)	8 (19)	10 (23.8)	42 (100)	0.04
Disability							
Mild	26 (11.5)	20 (9.2)	102 (45.6)	43 (19.4)	32 (14.3)	223 (100)	0.05
Moderate	0	0	14 (52.6)	11 (42.1)	1 (5.3)	26 (100)	

*Fisher's test

Table 5: Logistic regression analyses of baseline data with return to work after trauma

	Unadjusted models		Fully adjusted model		Final model	
	OR (95% CI)	P ^a	OR (95% CI)	P	OR (95% CI)	P
Demographic factors						
Age	1.8 (1.1-1.4)	0.03	1.46 (0.5-4.3)	0.069		
Sex	2.5 (1.3-5.2)	0.006	0.61 (0.2-2.3)	0.340		
Marriage	1.7 (1.1-1.7)	0.07	0.97 (0.9-1.0)	0.461		
Nationality	1.36 (1.1-1.4)	0.05	1.08 (0.9-1.5)	0.569		
Education	2.4 (1.2-2.7)	0.002	1.16 (1.0-1.3)	0.001	0.06 (0.1-0.9)	0.002
Insurance	1.24 (1.2-1.5)	0.02	0.77 (0.2-2.8)	0.002	1.4 (1.1-2.4)	0.005
Illness	1.08 (1-1.1)	0.01	0.98 (0.9-1.0)	0.334		
Smoking	1.3 (1.2-1.7)	0.00	7.58 (2.6-9.4)	0.541		
Addict	1.39 (1.1-1.8)	0.00	0.65 (0.1-2.3)	0.557		
Trauma factors						
Multi injury	1.48 (1.5-1.8)	0.00	0.17 (1.0-1.6)	0.007	0.24 (0.1-0.9)	0.003
Surgical treatment	1.50 (1.3-1.7)	0.00	0.36 (0.0-0.5)	0.174		
Posttrauma factors						
Moderate disability	2.50 (1.3-2.7)	0.05	4.30 (2.2-8.3)	0.002	1.29 (1.3-1.9)	0.002
PTSD	1.43 (1.5-1.8)	0.04	0.96 (0.9-1.0)	0.035		
God QOL	1.49 (1.3-1.6)	0.02	1.22 (0.8-1.4)	0.463		
Normal MH	1.25 (1.1-4.7)	0.1	1.16 (1.0-1.3)	0.280		
SES (base line)	5.75 (3.3-7.3)	0.003	6.16 (2.6-7.4)	0.001	6.86 (2.3-9.9)	<0.001

^aSignificance: P<0.05. CI: Confidence interval, OR: Odds ratio, PTSD: Posttrauma stress disability, QOL: Quality of life, MH: Mental health, SES: Socioeconomic status

In a study conducted by Kendrick *et al.*,^[13] rate RTW the 4-month after trauma was 57%. Moreover, RTW rate in studies conducted by Vles *et al.*^[11] was slightly higher than this study. These conflicting findings can be attributed to the differences in characteristics of the studies such as follow-up period, study population, inclusion criteria, and definition of RTW as well as patients' access to health-care services.

There were differences among patients in RTW status and personal factors and physical and psychosocial functioning. Predictors of RTW were as follows: measurement occasion, education (high/low), coping, and physical and cognitive functioning.

Findings of this study showed that the RTW time in the age group of >30 years was significantly longer than other age

group. Other studies also demonstrated that age is a predictor for RTW.^[5,11,13,33]

Study findings indicated that was significant difference between male and female participants regarding RTW rate and time. However, several other studies reported gender as a predictor for RTW.^[11,14]

RTW time among nonillness and nonsmoking and nondrug or alcohol abusers was significantly greater than illness and smoking and drug or alcohol abusers. Other study also found that illness and smoking and drug and alcohol abuse were significantly associated with lower RTW.^[13,33]

Study findings also showed that people with insurance coverage had a significantly high rate of RTW. However, in study of

Abedzadeh-Kalahroudi *et al.*^[5] Kaplan–Meier analysis showed a longer RTW survival rate among patients without insurance coverage. These conflicting findings can be attributed to the differences in characteristics of the studies such as study population, follow-up period, inclusion criteria, and definition of RTW as well as patients' access to health-care services.

Findings of this study showed that RTW rate among people with middle SES was high than patients with low and high SES status and in high SES was lower than people with low SES status. The difference was not statistically significant. A study of Abedzadeh-Kalahroudi *et al.*^[5] also was similar to our finding. Several studies reported it as a significant predictor for RTW.^[14,33,34]

Some studies survived specific types of trauma such as major traumas or multiple traumas or extremities or head.^[5,31,33-35] Very factors related to trauma and posttrauma condition reported for prediction of RTW such as number of injured organs, type of trauma, prolonged hospital stay, intensive care unit admission, and length of hospital stay. Cases of multiple and severe trauma, hospital complications, pretraumatic health and QOL, brain and spinal cord injury, and physical and psychosocial functioning after trauma.^[11,35,36] Albeit, in sum of study, this factor does not significantly contribute to RTW.^[5,37,38]

In a study by Vles *et al.*, in 2005, 295 patients concluded that more than 50% of patients were engaged in daily activities 1 year after traumatic injury. Furthermore, 74% (84) of the 127 patients returned to work. The number of the organs affected, the severity of injury (ISS) score ≥ 25 , and the female gender each can be an independent predictor of long-term complications of trauma.^[11]

A study in Kashan was conducted by Abedzadeh-Kalahroudi *et al.* To investigate the relationship between SES and trauma outcomes after 3 months of trauma, 71.4% of patients returned to their daily work.^[5,39]

There is not a given timeframe for the definition of recovery and RTW, and there are few long-time follow-up studies focusing on RTW after trauma.

Findings of this study showed that people with traffic injury, multiple injury, and nonsurgery treatment also; mild disability and have PTSD and moderate QOL, and have longer time of RTW. Patients with major traumas usually have a longer. This people almost have long hospital stay and recovery that Cassese to delayed to RTW. Some studies also reported multiple trauma as a predictor of RTW.^[5,11,34] Abedzadeh-Kalahroudi *et al.*^[5] found that individuals with single traumas had significantly shorter RTW survival rate and with a mean score of WHODAS II in patients who returned to work was significantly lower than patients with non RTW. Single traumas are usually less severe and are associated with milder disability. Furthermore, Clay *et al.*^[33] found that the probability of early RTW was higher among patients with single orthopedic injuries. Soberg *et al.* 20 also reported the same finding. However, previous studies

reported it as a predictor for RTW.^[12,37] Kendrick *et al.*^[13] also reported that disability was a strong predictor for RTW. However, Soberg *et al.*^[40] found that disability cannot predict RTW probably due to its moderate correlation with length of hospital stay.

Strengths and limitations

One strength of this study is that it is the first population-based study which assessed RTW among injured people aged over 15 years in Iran. Moreover, this study was its survived relationship RTW with at three levels of factor: preinjury (demographic) factors, injury-related factors, and postinjury factors that show factors related to injury alone do not explain the functional posttraumatic injury and RTW. Personal factors including age, gender, education, type of work, coping strategies have an important impact. One of the other strengths of this study was use of a valid and reliable instrument for disability, PTSD, QOL, and MH assessment.

The limitations of the study were including a general injury population with injuries of varying levels of severity, measuring a series of psychological predictors of RTW, and adjusting for several potential confounders. Another limitations include bias: patients who were participants in this study may have differed to exactly remember in terms of time of injury or hospitalization to RTW.

CONCLUSION

Findings of this study indicated that time of RTW was related to three levels of factor: preinjury factors, injury-related factors, and postinjury factors, these factors are age, sex, marriage, insurance coverage, SES status, illness, smoking, and addict, also multi injury, surgical treatment and moderate disability, PTSD, God QOL, and normal MH. Therefore, these factors need to be evaluated in larger-scale, long-term studies with more homogeneous samples in terms of the type and the severity of traumas.

Acknowledgments

This study was from a Ph. D. dissertation and supported by a grant from the Kashan Medical Science University Foundation. Also have received Research project code (97148) and code of ethics (1397,094).

Financial support and sponsorship

This study was from a Ph. D. dissertation and supported by a grant from the Kashan Medical science university Foundation.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Naghavi M, Abolhassani F, Pourmalek F, Lakeh M, Jafari N, Vaseghi S, *et al.* The burden of disease and injury in Iran 2003. *Popul Health Metr* 2009;7:9.
2. Azami-Aghdash S, Sadeghi-Bazargani H, Shabaninejad H, Abolghasem Gorji H. Injury epidemiology in Iran: A systematic review. *J Inj Violence Res* 2017;9:27-40.

3. Gosselin RA, Spiegel DA, Coughlin R, Zirkle LG. Injuries: The neglected burden in developing countries. *Bull World Health Organ* 2009;87:246a.
4. Saadat S, Hafezi-Nejad N, Ekhtiari YS, Rahimi-Movaghar A, Motevalian A, Amin-Esmacili M, *et al.* Incidence of fall-related injuries in Iran: A population-based nationwide study. *Injury* 2016;47:1404-9.
5. Abedzadeh-Kalahroudi M, Razi E, Sehat M, Asadi-Lari M. Return to work after trauma: A survival analysis. *Chin J Traumatol* 2017;20:67-74.
6. Smith GS, Wellman HM, Sorock GS, Warner M, Courtney TK, Pransky GS, *et al.* Injuries at work in the US adult population: Contributions to the total injury burden. *Am J Public Health* 2005;95:1213-9.
7. Rahmani F, Sepehri Majd P, Ebrahimi Bakhtavar H, Rahmani F. Evaluating the accuracy of emergency nurses in correct triage using emergency severity index triage in Sina hospital of Tabriz: A cross-sectional analysis. *J Emerg Pract Trauma* 2018;4:9-13.
8. Dembe AE. The social consequences of occupational injuries and illnesses. *Am J Ind Med* 2001;40:403-17.
9. Du CL, Lai CF, Wang JD. Delayed return-to-work in workers after non-severe occupational upper extremity fracture in Taiwan. *J Formos Med Assoc* 2007;106:887-93.
10. Lehmann U, Pape HC, Seekamp A, Gobiet W, Zech S, Winny M, *et al.* Long term results after multiple injuries including severe head injury. *Eur J Surg* 1999;165:1116-20.
11. Vles WJ, Steyerberg EW, Essink-Bot ML, van Beeck EF, Meeuwis JD, Leenen LP. Prevalence and determinants of disabilities and return to work after major trauma. *J Trauma* 2005;58:126-35.
12. Holtslag HR, Post MW, van der Werken C, Lindeman E. Return to work after major trauma. *Clin Rehabil* 2007;21:373-83.
13. Kendrick D, Vinogradova Y, Coupland C, Christie N, Lyons RA, Towner EL, *et al.* Getting back to work after injury: The UK Burden of Injury multicentre longitudinal study. *BMC Public Health* 2012;12:584.
14. Kendrick D, Dhiman P, Kellezi B, Coupland C, Whitehead J, Beckett K, *et al.* Psychological morbidity and return to work after injury: Multicentre cohort study. *Br J Gen Pract* 2017;67:e555-64.
15. Salmi LR, Cassidy JD, Holm L, Cancelliere C, Côté P, Borg J. Introduction to the Findings of the International Collaboration on Mild Traumatic Brain Injury Prognosis: What is a Prognostic Study? *Arch Phys Med Rehabil* 2014;95 Suppl 3:S95-100.
16. Vikane E, Hellström T, Røe C, Bautz-Holter E, Assmus J, Skouen JS. Predictors for return to work in subjects with mild traumatic brain injury. *Behav Neurol* 2016;2016:8026414.
17. Cancelliere C, Kristman VL, Cassidy JD, Hincapié CA, Côté P, Boyle E, *et al.* Systematic review of return to work after mild traumatic brain injury: Results of the international collaboration on mild traumatic brain injury prognosis. *Arch Phys Med Rehabil* 2014;95 Suppl 3:S201-9.
18. Ownsworth T, McKenna K. Investigation of factors related to employment outcome following traumatic brain injury: A critical review and conceptual model. *Disabil Rehabil* 2004;26:765-83.
19. Nightingale EJ, Soo CA, Tate RL. A systematic review of early prognostic factors for return to work after traumatic brain injury. *Brain Impairment* 2007;8:101-42.
20. Fakharian E, Sehat Z, Sehat M. Traumatic spine injury in Kashan, Iran. *J Emerg Pract Trauma* 2019;5:65-70.
21. Karimi H, Soleyman-Jahi S, Hafezi-Nejad N, Rahimi-Movaghar A, Amin-Esmacili M, Sharifi V, *et al.* Direct and indirect costs of nonfatal road traffic injuries in Iran: A population-based study. *Traff Inj Prev* 2017;18:393-7.
22. Reihani H, Pirazghandi H, Bolvardi E, Ebrahimi M, Pishbin E, Ahmadi K, *et al.* Assessment of mechanism, type and severity of injury in multiple trauma patients: A cross sectional study of a trauma center in Iran. *Chin J Traumatol* 2017;20:75-80.
23. Sehat Z, Fakharian E, Sehat M, Omidia. Disability and post-trauma stress in the population over 15 years old in Kashan, Iran: A population-based study. *Chin J Traumatol*.Dec 2020;23:351-5.
24. Shafei S, Yazdani S, Jadidfarid M-P, Zafarmand AH. Measurement components of socioeconomic status in health-related studies in Iran. *BMC Res Notes* 2019;12:70.
25. Mansouri A, Emamian MH, Zeraati H, Hashemi H, Fotouhi A. Economic inequality in presenting vision in Shahroud, Iran: Two decomposition methods. *Int J Health Policy Manag* 2018;7:59-69.
26. Willmott SA, Boardman JA, Henshaw CA, Jones PW. Understanding general health questionnaire (GHQ-28) score and its threshold. *Soc Psychiatry Psychiatr Epidemiol* 2004;39:613-7.
27. Mahmoudi O, Amini MR. The reliability and validity of the post-traumatic stress disorder checklist (PCL) in the Earthquake-stricken population of Kermanshah, Iran. *Int J Health Life Sci* 2020;6:e101860.
28. Azami-Aghdash S, Gorji HA, Sadeghi-Bazargani H, Shabaninejad H. Epidemiology of road traffic injuries in Iran: Based on the data from disaster management information system (DMIS) of the Iranian red crescent. *Iran Red Crescent Med J* 2017;19:e38743.
29. Hafezi-Nejad N, Rahimi-Movaghar A, Motevalian A, Amin-Esmacili M, Sharifi V, Hajebi A, *et al.* A nationwide population-based study on incidence and cost of non-fatal injuries in Iran. *Injury Prevent* 2014;20:e9.
30. Murgatroyd DF, Harris IA, Tran Y, Cameron ID. Predictors of return to work following motor vehicle related orthopaedic trauma. *BMC Musculoskelet Disord* 2016;17:171.
31. Soroush D, Deloei MT, Reihani H, Vakili V, Gharaee AM, Tafakori A, *et al.* Characteristics of road traffic injuries in the second largest city of Iran. *J Emerg Pract Trauma* 2015;1:48-51.
32. Alemany R, Ayuso M, Guillén M. Impact of road traffic injuries on disability rates and long-term care costs in Spain. *Accid Anal Prev* 2013;60:95-102.
33. Clay FJ, Newstead SV, Watson WL, McClure RJ. Determinants of return to work following non life threatening acute orthopaedic trauma: A prospective cohort study. *J Rehabil Med* 2010;42:162-9.
34. Lilley R, Davie G, Ameratunga S, Derrett S. Factors predicting work status 3 months after injury: Results from the prospective outcomes of injury study. *BMJ Open* 2012;2:e000400.
35. O'Donnell ML, Varker T, Holmes AC, Ellen S, Wade D, Creamer M, *et al.* Disability after injury: The cumulative burden of physical and mental health. *J Clin Psychiatry* 2013;74:e137-43.
36. Cubbin C, LeClere FB, Smith GS. Socioeconomic status and injury mortality: Individual and neighbourhood determinants. *J Epidemiol Community Health* 2000;54:517-24.
37. Meerding WJ, Looman CW, Essink-Bot ML, Toet H, Mulder S, van Beeck EF. Distribution and determinants of health and work status in a comprehensive population of injury patients. *J Trauma* 2004;56:150-61.
38. Zheng QL, Tian Q, Hao C, Gu J, Lucas-Carrasco R, Tao JT, *et al.* The role of quality of care and attitude towards disability in the relationship between severity of disability and quality of life: Findings from a cross-sectional survey among people with physical disability in China. *Health Quality Life Outcomes* 2014;12:25.
39. Cubbin C, Smith GS. Socioeconomic inequalities in injury: Critical issues in design and analysis. *Annu Rev Public Health* 2002;23:349-75.
40. Soberg HL, Finset A, Bautz-Holter E, Sandvik L, Roise O. Return to work after severe multiple injuries: A multidimensional approach on status 1 and 2 years post-injury. *J Trauma* 2007;62:471-81.